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OPHTHALMIC LENS.

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To all whom it may concern:

Be it known that I, ANNA ESTELLE GLANCY, a citizen of the United States, residing at Southbridge, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Ophthalmic Lenses, of which the following is specification.

This invention relates to improvements in ophthalmic lenses and has particular reference to lenses of the multifocal type.

A great many people require correction for both near and long distance vision. Bifocal lenses have been developed for such correction but they have not been very satisfactory because while objects in two planes are in focus, all the intermediate distances are not clearly visible. This condition is especially annoying in going up or down stairs, or in alighting from vehicles; so it will be readily apparent that the bifocal lens is not a perfect corrective. Trifocal lenses were made to overcome this defect in bifocals, and while with lenses of this type one intermediate distance is brought into focus objects at the remaining intermediate distances are indistinct. Another objection to bifocals and trifocals lies in the fact that there is a line of division between the different fields. In moving the eye from one field to another there is a sudden jump in passing the dividing line due to the difference in power, and this causes a strain on the optic muscles.

In the past, some lenses with a multiplicity of foci have been devised, but some of them have been impractical of manufacture, and others have been undesirable because of surface astigmatism and spherical aberrations.

One object of the present invention is to produce an ophthalmic lens having a multiplicity of foci for reading, long distance, and intermediate vision.

Another object is to provide such a multifocal lens constructed of a single piece of glass.

Another object is to provide a multifocal lens having a power for long distance vision, a power for reading, and a multiplicity of powers for all intermediate distances, all of said powers blending gradually from reading to long distance power.

Another object is to provide a multifocal lens without any segment boundaries.

Another object is to provide such a multifocal lens which shall be free from surface astigmatism at all points.

Other objects and advantages will be apparent during the course of the following description, taken in connection with the accompanying drawings, wherein one form of the invention is shown. It is, of course, to be understood that the drawings are merely illustrative and that I do not limit myself to what is herein shown and described, but that I reserve the right to make changes falling within the scope of the claims without departing from the spirit of the invention.

In the drawings:

Figure 1 is an elevation of a lens made in accordance with my invention.

Figure 2 is a transverse sectional view on the line 2—2[a] of Figure 1.

Figure 3 is a similar view on the line 3—3[a] of Figure 1.

Figure 4 is a mathematical diagram of the multifocal surface.

Figure 5 is a sectional view illustrating one step in the manufacture of my improved lens.

Figure 6 is a view partly in section, illustrating one method of grinding the multifocal surface.

Similar reference characters designate corresponding parts throughout the several views.

My improved lens 10 is provided on one of its sides 11 with a spherical surface 12 on its upper portion for distance vision correction, and a symmetrical multiple osculating spherical surface 13 on its lower portion for near and intermediate vision correction. The latter surface is generated by the rotation of a circle about a diameter (the Z axis) simultaneously with a continuous change in the radius of this circle, the center of the circle moving along the Z axis, and the intersection of the Z axis with the surface remaining fixed and forming the vertex of the surface. This